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CONSERVATION

The GCI Newsletter



Conservation of Sites

The Getty Conservation Institute Newsletter

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Front cover: Anasazi ruins at Pueblo Bonito, Chaco Canyon, New Mexico. Photo: Barry Rokeach, The Image Bank. Back cover: Globe photo by Dennis Keeley.

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SITE CONSERVATION

A Question of Values

The desire to visit historic places is as ancient as civilization. Nearly three and a half thousand years ago, Saqqara, the site of Egypt's first stone pyramid — then already a millennium old — was attracting a considerable number of visitors. Among them were a number of scribes who engraved their reactions in hieroglyphics on the walls of Saqqara's chapels. More than one wrote that he "found it beautiful..."

Compared with the tradition of tourism, the concept of managing and maintaining historic sites seems utterly modern. But the Egyptians, in fact, had a strong reverence for their past. Repairing, restoring, and maintaining ancient places of importance often occupied the minds of pharaohs. At the end of the 15th century B.C.E., Tutmosis IV ordered the sand inundating the Sphinx at Giza cleared away so that the ancient figure could be restored. Over a century later, Rameses II had his son Khaemwaset organize the restoration of certain structures in Saqqara.

If Egyptian civilization, whose dynasties spanned 3,000 years, had paid no attention to the care of ancient sites, one wonders how many fewer of those remarkable places would be left to us now.



Temple of the Warrior, Chichen Itza, Mexico.

Photo: Dennis Keeley.

A CONSERVATION ISSUE

For decades, the mandate of conservation has included not only a broad spectrum of objects — fine art, historical, and ethnographic — but also sites and monuments. Sites, like movable art, are a part of our cultural heritage. Their presence helps define the historical character of a community or nation. In those societies where the link to the past through cultural traditions remains unbroken, many historic sites “live” through centuries of continuous use. In every society, sites and monuments contribute to an appreciation and understanding of the past, and a sense of historical continuity.

Sites are also rich in information. Unfortunately, this is not universally recognized. As GCI Special Projects Director Neville Agnew notes: “The actual

significance of historical sites and the information which they convey are somewhat remote from the public mind generally. I don’t think it’s something that leaps out and hits the public unless it is communicated. Certainly it’s something that should be communicated — the inherent information that is locked into materials and the context of the site itself.”

Because their environment and security are not easily controlled, sites and monuments are more vulnerable than movable cultural property. Climate, vandalism, neglect, natural disasters, and indifference all contribute to the degradation of a site. Often when an archaeological team completes its excavation, it leaves the site to the elements with no plan in place for the site’s preservation and care. The Anasazi sites in New Mexico’s Chaco Canyon, for example, were widely excavated in the early part of this century with little thought given to how the architectural ruins would be protected once exposed. As a consequence, the U.S. National Park Service today is confronted with miles of masonry walls needing maintenance — and a shortage of resources to do it. (See *News in Conservation*, page 12.)

Sites can also be victims of mismanagement. If a plan does exist but the site is poorly maintained, the typical result is decreased visitor respect for the site’s physical integrity. Far too many sites, including some of world class stature, suffer from neglect or abuse. When governments perceive sites primarily as a mechanism for producing tourist dollars, sites can be destroyed through uncontrolled access.

“It is far easier to get five jumbo jet loads of tourists to a place than to have the infrastructure to receive them,” says Nicholas Stanley Price, GCI Training Program Deputy Director. “As more and more countries become accessible to tourism, there are going to be bursting points where sites suddenly receive all these tourists while lacking the infrastructure to deal with them.”

Site management plans today can have a variety of objectives, such as site development, increasing visitor access, and enhancing a site’s educational value. The

plan’s ultimate goal, however, should be to conserve and protect the site for future survival. When properly conceived and implemented, management plans serve as tools to ensure well-conceived decision-making regarding the conservation of a site — its unexcavated objects and features, exposed elements, ephemeral nature, and potential historical and cultural values.

Over the years, international organizations have attempted to codify standards to conserve and protect historic sites. Perhaps the seminal document is the Venice Charter, adopted in 1966 by the International Council on Monuments and Sites (ICOMOS). In its preamble, the Charter declared it “essential that the principles guiding the preservation and restoration of ancient buildings should be agreed upon and be laid down on an international basis, with each country being responsible for applying the plan within the framework of its own culture and traditions.”

The Charter, in sixteen terse articles, outlines the objectives of — and the limits of acceptability in — the conservation and restoration of historic monuments. Its usefulness as a guide remains. But while it defines conservation and restoration in a fundamental way, the Charter is arguably a document with a Eurocentric view. Those who drafted it were charged with the responsibility of caring to a large extent for the monuments of cultures that had long since passed into history. In addition, the emphasis of their work was more on structures than places. Perhaps for that reason, the Charter refers primarily to monuments, not sites.

In 1979, the Australian chapter of ICOMOS, building on the foundation of the Venice Charter, adopted its own “Charter for the Conservation of Places of Cultural Significance.” Commonly known as “The Burra Charter” (for the town in which it was adopted), the document, among other things, includes two important concepts, both of which appear in its title: “place” and “cultural significance.”

Under the Burra Charter, it is the conservation of places, not simply structures, that is called for — with place defined as a “site, area, building or other work,

group of buildings or other works, together with associated contents and surroundings." This broad definition reflects in part the Australian experience with its aboriginal culture, a living culture that values, as sacred, places within the natural landscape. Because the aboriginal culture continues, these values are alive and influence the contemporary landscape and its treatment.

The concept of "value" is only part of the Burra Charter's departure from its predecessor, the Venice Charter. The Burra Charter addresses the "why" of conservation by including the concept of cultural significance which it defines as "aesthetic, historic, scientific or social value for past, present or future generations." The Charter holds cultural significance as the justification for conservation. Indeed, it specifically defines conservation as "all the processes of looking after a place so as to retain its cultural significance."

THE MANAGEMENT PLAN

With appropriate conservation as the ultimate objective, what does successful site management require? Certainly resources, but the issue neither begins nor ends there.

"Although the expenditure of money is always necessary," says Dr. Stanley Price, "I don't see the lack of huge financial resources as a real impediment to the implementation of good site management."

The conservation and preservation of a site depends upon the execution of a thoughtfully prepared site management plan. For the plan itself to be effective, it must be the result of a careful process that includes at the beginning two critical steps — defining the cultural significance of a site, then reconciling the positions of all parties with interests in the site.

"Most commonly in the past, those first two steps have not been taken," Dr. Stanley Price observes. "People have gone straight to technical solutions without thinking about what it is people want to get out of the site, and what is conducive to the preservation of the site. Technical conservation measures are only one element in the plan."

Assessing the significance of a site is but one of several key elements that go into a management plan. Equally important are several others, including documenting the history of the site, reviewing the site's physical condition and current conservation problems, and analyzing the legal, social, and physical factors that affect site manage-

ment options. Once these are complete, a management policy can be defined and a conservation strategy selected.

While significance assessment is only one component of the process, its consideration is essential. Sharon Sullivan, Director of the Australian Heritage Commission, believes that in order to know what should be done, one must know why one is doing it.

"Problems in site management often occur because people don't first consider what it is they're trying to conserve and whether it has value in the first place," remarks Ms. Sullivan. "If a site does have value, you really have to

"It is far easier to get five jumbo jet loads of tourists to a place than to have the infrastructure to receive them."

think about whether it's the fabric or the form that has the value, whether the value relates to the setting or — as in prehistoric or aboriginal sites — to the value that aborigines place on it. Of course, most places have more than one value which is why you have to think through all of them before you decide which management technique is appropriate." (See Profile, page 8.)

Though what makes a site important may seem obvious, too infrequently is it directly addressed. "The values are certainly things that people don't consciously sort out in their minds," says Dr. Agnew. "It's a very important element of the process. Certainly, the first step."

The kinds of values that can be attributed to a site fall into several broad classifications, including historical, sci-

entific/research, aesthetic/artistic, religious/spiritual, and social/ethnic values. Others, such as economic and educational values, may follow from these. Determining a site's values, their relative importance, and their impact on the conservation of a site cannot be done unilaterally. The process must involve all who have an interest in the site.

THE CONSULTATION PROCESS

The trouble with many past and present site management plans is their top-down approach. Often outside consultants are hired and, after spending a brief period of time in an area talking with people, prepare a plan far from the actual place and community to be affected. The result, frequently, is a huge gap between what the plan is advocating and what the people in the area see as being necessary.

Such was the case ten years ago in Chile where the national agency responsible for managing natural resources and archaeological sites, the Corporación Nacional Forestal (CONAF), hired outside groups to create their management plans. According to Angel Cabeza, an archaeologist with CONAF, "this kind of process failed because often the people who made the plan didn't know well the area or its special problems."

Today the procedure for creating site management plans in Chile is more inclusive. It begins with a three-to-four month period during which CONAF personnel travel to the area involved to collect information and become familiar with the relevant issues. Their work includes spending time with local residents and encouraging their participation. This initial phase is followed by seven to ten days of intensive meetings with CONAF staff, specialists, and leaders of the local community. During these meetings the plan's objectives are clarified and programs to carry out those objectives outlined. On the basis of these discussions, a document containing the management plan is subsequently prepared.

While conservation of archaeological sites is a relatively new concern for CONAF, Dr. Cabeza says it is now an element of the process. By including local residents in the deliberations over a site, he states, "we have more control over the success of the conservation program."

As those at CONAF realized, communication and consultation is needed with a number of constituencies, ranging from the local population (which may include indigenous groups) to landowners, land-users, local





industries, scholars, and representatives of governmental agencies. All who have a stake in a site must be involved to reach consensus on a site's significance and the best way to protect it.

Margaret Mac Lean, GCI Training Program Senior Coordinator, believes that this process itself has value. "It's moving from the recognition of a site's importance and the need to manage it, to assessing the significance of the place and coming up with a negotiated statement that balances significance against visitation and all the things that might threaten the value of the place. Working out the relative positions of value and community and so forth is an enormously valuable process. It teaches everybody so much about what is needed and about the richness of the opinions of other groups."

E. Charles Adams, curator of archaeology at the Arizona State Museum in Tucson, agrees. During the late 1980s, Adams served on the technical advisory committee helping devise a master plan for Arizona's Homolovi Ruins State Park, the site of six large Hopi pueblos occupied between 1250 and 1400 C.E. Dr. Adams believes the committee was effective because it was broadly based, including representatives of the Hopi, local landowners, and business people from the nearby town of Winslow.

"A lot of people attended the meetings and were able to understand all the concerns," says Dr. Adams. "We

could work out compromises in terms of people with property who would be affected, people who had grazing rights, people interested in environmental preservation, land managers from state and federal agencies, archaeologists, and the Hopi as well."

According to Dr. Adams, the Hopi had a strong obvious interest in the way the site was handled. "They wanted to see the park developed to protect the villages, but also to begin communicating information about their own tribal history. They saw it as politically advantageous in terms of presenting their own ideas and philosophies."

SUCCESSFUL SITE MANAGEMENT

Obviously, successful site management entails more than assessment through consultation. It must be accompanied by the other elements of site assessment, then followed by the careful selection and implementation of a conservation strategy.

There is as well a third component, frequently overlooked but fundamental to a site's preservation — maintenance. Without a consistent and comprehensive maintenance program, the benefits of a well-prepared management plan can vanish as a site's condition deteriorates through human neglect. The importance of maintenance is articulated in the first of the "Conservation

Principles" in the Burra Charter: "The aim of conservation is to retain the cultural significance of a place and must include provision for its security, its maintenance and its future."

Still, assessing value through consultation and consensus is an important starting point. But value, as Dr. Mac Lean observes, is not static. "Recognizing that a place has interest and value is one thing," she says. "Recognizing that those things change over time is something else entirely. Value is a very dynamic idea. It comes and goes. Introducing that concept can sometimes make people uncomfortable because it reminds them that their point of view is as ephemeral as the next person's."

If values are dynamic, site management strategies must be the same. Ultimately, successful site management is not so much an end, but a process, one that seeks retention of the cultural significance of a place while acknowledging and accommodating a shifting consensus on the nature of that significance. ■

Pyramids at the Mayan sites of Tulum (left) and Chichen Itza (above) in Mexico. Photos: Dennis Keeley.

a conversation with
SHARON SULLIVAN
 Director of the Australian
 Heritage Commission



Sharon Sullivan is Director of the Australian Heritage Commission, the national agency responsible for developing a comprehensive register of areas of cultural and natural significance and for promoting their conservation. She previously served as Deputy Director of the National Parks and Wildlife Service of New South Wales.

Nicholas Stanley Price is Deputy Program Director, Training Program, the Getty Conservation Institute. Please see the Staff Profile on page 19 for additional information.

Sacred Landscapes

For over twenty years Sharon Sullivan has been involved with cultural resource planning in Australia. Throughout her professional life she has dealt with the issues of conservation and site management. Since the mid-1970s she has taught professional courses on site management and protection, including several organized by the Getty Conservation Institute. Ms. Sullivan served as principal instructor for the GCI's annual course on "Rock Art Site Management and Protection" in 1989, 1991, and 1992, and helped develop the Graduate Diploma Course in Rock Art Conservation at the University of Canberra in collaboration with the GCI. She also consults with the GCI on site management projects in China and in Baja California Sur. This spring, she spoke with Nicholas Stanley Price, GCI Training Program Deputy Director, about her experiences.

Nicholas Stanley Price: From the beginning of your career you've been interested in the management of cultural sites. What does it take to successfully implement site management plans?

Sharon Sullivan: A lot of plans don't work because they haven't been developed with all the key interest groups involved — or at least in agreement. There's a tendency to call in an outside expert who might develop a wonderful plan, but one that doesn't get implemented.

The reason for that may be two-fold. The key people — who are often political — are not necessarily sold on the idea. They don't understand it, they haven't been through the process that led you for perfectly good reasons to make certain decisions. So the political will may be missing.

Secondly, a management plan has to fit the culture and bureaucratic climate of the place for which it is developed. You have to keep in mind what people are going to be able to do. There's no point in doing a perfect plan if there's no way of implementing it.

Sometimes when people talk about the use of local consultation in Australian site management, they say: "Well, their aboriginal population has to be consulted by law. In other countries, it's different." Presumably you'd strongly disagree with this?

I do strongly disagree. We started consulting aboriginal people in 1973, and by 1977 we had successfully implemented a system whereby no site got managed, destroyed, or developed without consultation with the local community. However, there's still no legislation to insure that.

In Australia there's been a move for more active involvement of indigenous people in

site management so that all government agencies involved would have aboriginal peoples trained as rangers or administrators. In the United States, too, there's been a mounting interest in consultation. The concerns are similar. People are fragmented, you don't know who to talk to, there's no direct association, and so on.

These are problems that can be overcome. It is interesting and exciting to see the revival of interest among indigenous people and groups reclaiming their culture.

When you talk about local consultation, are you including all local groups?

Of course. You need to have people involved and committed. It's only common sense. But it also relates to the fact that the heritage belongs to the people.

How do you see cultural resource management in relation to natural resource management?

In Australia we're moving toward an integration of these things. Certainly we have the opportunity to do so with the organization I now work for, the Australian Heritage Commission, which advises on both natural places and cultural sites.

The 20th century tide of Coke bottles which is affecting the environment so badly is also sweeping away traditional lifeways. In both cases we've reached the stage where we're really looking at little islands of things that are left in the middle of this sea.

It's important to see things in an integrated way. One of the clearest examples of integration is the aboriginal view of the environment. Sites are sacred to aboriginal groups because the landscape is sacred. These sites are pinpoints in a sacred landscape, a focus of the power in the landscape which is made and upheld by the aboriginal ceremonies. The significance of the site is seen within the context of its environment. The same holds true for cultural places, whether they're historic or prehistoric. They arise out of an interaction with the landscape. If there is a methodology to assess the importance of cultural and natural values, then the potential for conflict is not great.

Are there areas of cultural heritage preservation in which Australia has been particularly successful?

I think one of the things we've been able to contribute is a less formalized, more relaxed, and more opportunistic way of dealing with the range of issues related to conservation.

By comparison, a lot of sites are much better managed in the United States because of more resources, more staff, and a bigger population to support them. Australia, on the other hand, has had to develop a number of management techniques that are low-key, practical, and clever — which is what management is all about. We've tended to develop approaches that allow sites to manage themselves to some extent.

In that sense, I suppose, Australia can serve as a model for countries with few resources.

Australia, in part because of its position on the edge of Asia, in part because of its remoteness and this on-the-ground problem solving ability, is in a good position to do that.

On the other hand, we in Australia are also learning an amazing amount from Asia, particularly about the different views of the past. The Venice Charter is written for monuments, mostly for ancient monuments, and mostly for monuments which relate in large part to a past civilization. There's this feeling about the past and about keeping things intact — a need for authenticity and respect for the original fabric. There is also the issue of significance. It often seems that the real significance of something like the Pyramids or Chartres Cathedral is its beauty and craftsmanship.

But this is often quite different for a temple in Thailand or in China which may be as old or as historically important but is part of a living culture that responds to it in a different way. There, it is the sense of place that is important, as opposed to the fabric, which is analogous to the aboriginal approach to place.

Determining why we value a site or place is really the first step, isn't it?

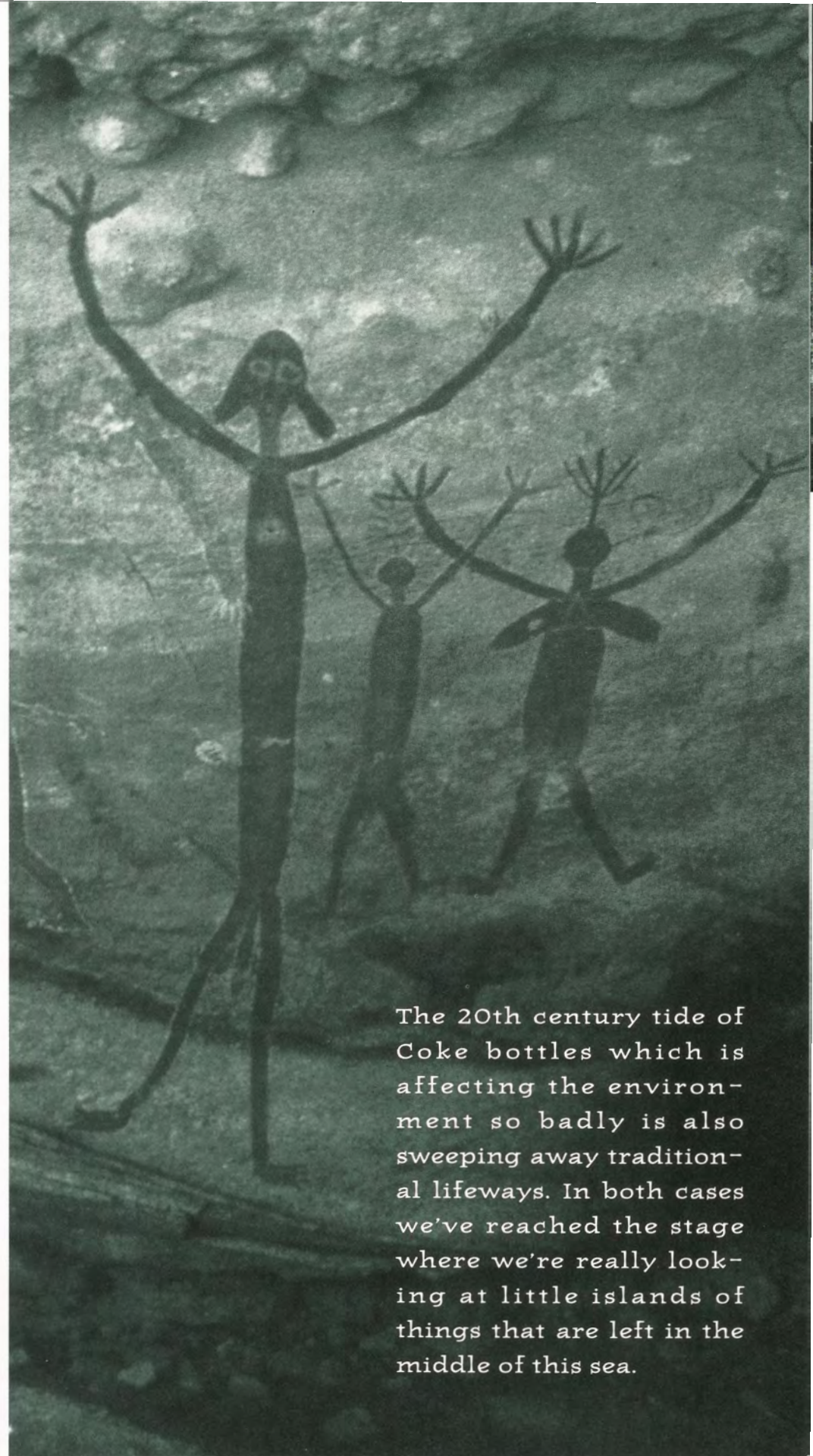
Yes. The first thing is to look at the cultural significance. By doing that, you reveal the values and nuances in the society, which may or may not relate to the fabric of a site. If you do this first — rather than rushing in and saying, "well, this is 15th century, we should preserve it" — then the other things follow.

Thinking about the cultural significance of things has the potential to change people's ideas about the past. If you get people to actually think about why things are there, then interesting ideas develop. You get ideas that are sometimes difficult for professionals to deal with, and which cause conflicts in our own disciplines. But they're important.

We've done some interesting studies which indicate that people's views at the local level of what is important in their past are different from the standard sets of significance. They might end up with 80 or 90 percent of the same places, but the reasons they value them — and therefore the way in which they think future development should happen — are different. ☞

Facing page: Sharon Sullivan, left, examining a publication of the Australian Heritage Commission.

This page: Rock art site, Laura, Australia.



The 20th century tide of Coke bottles which is affecting the environment so badly is also sweeping away traditional lifeways. In both cases we've reached the stage where we're really looking at little islands of things that are left in the middle of this sea.

International Symposium on the

GREAT SPHINX

10

Few monuments of antiquity arouse as much fascination and awe as the massive limestone figure that reclines on the sands of the Giza Plateau. When Pharaoh Chephren ordered its construction during Egypt's 4th Dynasty, he sought an everlasting memorial to his divine reign. Among history's contenders for eternity, Chephren succeeded better than most. Sixty-six feet high (20 meters) and 240 feet (73 meters) long, the Great Sphinx has endured for 4,600 years as an icon of Egyptian civilization.

It has survived, but not without serious scars. Throughout its existence — and possibly at a greater rate in this century — the carved monument has been slowly but relentlessly flaking away. Despite decades of study, knowledge of the forces responsible for the Sphinx's seemingly inexorable deterioration remains incomplete. What is certain is that without some mitigating measures, the physical integrity of this universally recognized symbol of our past will continue its decline.

To address the complicated question of what should be done, the First International Symposium on the Great Sphinx was convened by His Honorable H.E. Farouk Hosni, Minister of Culture for Egypt. Held in Cairo between February 29 and March 3 of this year, the conference was attended by 90 invited Egyptian and foreign experts from a variety of disciplines.

According to Mohamed Ibrahim Bakr, Chairman of the Egyptian Antiquities Organization (EAO), the EAO has received numerous suggestions in recent years for preserving the Sphinx. The function of the conference was to "provide the proper forum for objective assessments of offered methodologies" and to facilitate the exchange of information.

Zahi Hawass, the EAO's Director for the Giza Plateau, stated that the conference was "the first time we've looked at how to protect the Sphinx with a long-term preservation plan. It's also the first time Egyptians have brought experts from all over the world to look at the history and conservation problems of a specific monument. The reason is that the Egyptians believe that the Sphinx belongs to people from all over the world."

Twenty papers on a variety of subjects were presented. Topics included the geologic formations of the statue, the effects of meteorological and geophysical conditions, computer and photogrammetric documentation, computer and aerodynamic modeling, and preventive conservation measures.

In addition to reviewing technical conservation problems of the Sphinx, the conference considered site management approaches for the entire Giza Plateau, a World Heritage Site southwest of Cairo. The Plateau is the location of not only the Sphinx but also the well-known pyramids of Cheops, Chephren, and Mycerinus, as well as a number of other important archaeological finds from approximately 2,500 years of Egyptian history.

Conference participants reviewed the history of the Sphinx's restoration, carried out since before Roman times, and discussed the monument's current treatments such as stone cladding of lower portions of the immense structure. Participants acknowledged that preservation efforts appear to have improved in recent years. Mark Lehner of the Oriental Institute of the University of Chicago has documented the Sphinx since 1979. Dr. Lehner presented his results and noted that "the architectural records of the Sphinx make it possible to construct

a computer model of the current condition of the monument and its hypothesized condition during ancient times.” Lehner believes that additional refinements to the model will be useful in future conservation studies.

The limestone used in construction of the Sphinx varies greatly in durability.

While the stone for the head and base is relatively hard, soft layers of limestone alternate with harder limestone in the body portion in between. It is here that the most serious deterioration can be seen. What remains unsettled is just how quickly this deterioration is occurring. Norbert Baer of the Conservation Center of New York University’s Institute of Fine Arts believes that more documentation on the rate of erosion is needed to acquire a better understanding of the mechanisms of the monument’s deterioration.

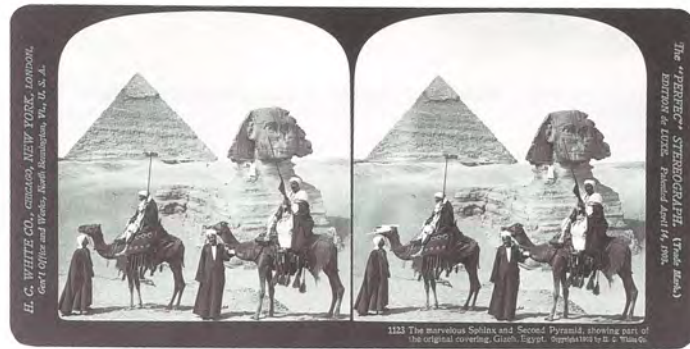
The results of the recently completed, year-long environmental monitoring of the Sphinx, conducted by the GCI and the EAO, were presented by Frank Preusser, GCI Associate Director for Programs and Scientific Program Acting Director. The environmental study found greater than anticipated climate fluctuations around the Sphinx, particularly in terms of air temperature and relative humidity. It also found that winds at times achieved an unexpected velocity.

The degree of fluctuation in humidity is relevant because of the composition of the limestone. The gypsum and sodium chloride contained within the rock absorb moisture and dissolve at higher levels of humidity. When the humidity drops below those levels, the water evaporates and these salts crystallize. The environmental monitoring study indicates that this humidity cycle is occurring nearly every day.

Continual salt crystallization, which has a destructive effect on the stone, would explain at least some of the deterioration of the Sphinx. Certainly there are other possible sources of moisture at Giza besides humidity, such as rising ground water and rainfall. But the effect of these factors has yet to be quantified to the extent that has now been done with relative humidity.

A number of different theories have been offered regarding the causes of the Sphinx’s deterioration. Factors such as wind erosion, sand erosion, airborne salts, seismic activity, and vibrations due to vehicular traffic have been considered. Atmospheric pollutants, the consequence of the urban area adjacent to the Plateau, may also have an impact.

Because subsurface data from the Sphinx could help



1123 The marvelous Sphinx and Sacred Pyramids, distant view of the original covering, Giza, Egypt, copyrighted by H. C. White Co.

quantify the importance of other factors, some symposium participants recommended that a depth profile of the Sphinx be conducted to see how deep the temperature and humidity fluctuations extend into the rock. There was also a discussion of controlled chemical consolidation experiments on the uncut rock adjacent to

the Sphinx that contains the same geological strata as the monumental figure.

At the conclusion of the conference, participants recommended that a multidisciplinary international committee be formed to study proposals for the protection of the Sphinx with a “view to formulating a unified, final, comprehensive master plan of action, ready for immediate implementation.” The EAO has indicated it will establish such a committee.

Dr. Hawass stated that future action will be determined by additional studies yet to be completed. “Plans for protecting the Sphinx should be based on evidence, not imagination. We will wait for more data and experiments and reconvene a second international symposium when there is more information to review,” he said. “In the meantime there will be more deterioration studies including sampling to analyze the rock and a comprehensive study of the environment. And we will review new site management proposals for the Giza Plateau as early as October of this year.”

Clearly it is far too early to say whether the Sphinx’s present rate of deterioration can be abated. Nevertheless, the fact that the monument is now formally an object of international inquiry suggests that more vigorous efforts will be made on its behalf. “The Sphinx’s smile is beaming bigger after the conference,” said Dr. Hawass. ☞



Facing page: Photo ca. 1890 by G. Lékégian, reproduced courtesy of Barry Iverson, Cairo. This page: Top, stereograph, 1908, by the H. C. White Co., reproduced courtesy of the U.S. Library of Congress. Above right, engraving from Napoleon’s expedition in 1798, first published in 1809. Left, the 1889 Chicago White Sox visiting the Sphinx while on tour, reproduced courtesy of the Baseball Hall of Fame, Cooperstown, New York.



CHACO
PROTECTING ANCIENT RUINS
CANYON



A little over a thousand years ago, a great community flourished within the desert mesas of northwestern New Mexico. There, along twisting, cliff-lined Chaco Canyon, the Anasazi people established an astonishing series of settlements that included elaborately irrigated fields, an extensive system of roads, and hundreds of stone masonry structures constructed from carefully cut blocks of sandstone.

Among these structures were a number of monumental multistory buildings, known today as the Great Houses of Chaco. Each contained dwelling spaces, storage rooms, a central plaza, and kivas — round subterranean chambers used for ceremonial purposes. The Great Houses rose four or five stories high, and the largest of them, Pueblo Bonito, had 650 rooms upon completion.

For reasons that remain a matter of debate, the settlements fell into disuse during the 1200s. An extended drought is one possible explanation. Whatever the cause, the Anasazi departed, bequeathing their remarkable constructions to the sun, the rain, and the wind.

Seven hundred years later much of their accomplishment still stands. Extensively excavated during this century, the ancient ruins in Chaco Canyon now are managed by the U.S. National Park Service (NPS) which operates Chaco Culture National Historical Park, a World Heritage Site.

With over eight miles of stone walls to preserve in the 34,000-acre park, the ruins present a formidable conservation challenge. Michael Taylor, an archaeologist with the NPS Southwest Region's Division of Conservation, says funding

limitations have created real problems in preserving Chaco's architectural ruins. "What we're confronted with now is a diminishing budget to hire people to maintain the walls."

Ironically in this semi-arid canyon, the most erosive factor in the walls' deterioration is water. In winter it comes as snow which piles up on the tops and at the base of the walls. Water percolates down from the top, freezes at night in wall cavities, and leads to buckling of the masonry. Snow melting on the ground creates a rising dampness that causes erosion at the base of the walls. To reduce these problems, snow is removed by snow blower from the tops of the walls and manually from the base of the walls — highly labor-intensive tasks.

The torrential thunderstorms of summer cause similar and different problems. Rain saturating the ground leads to capillary rise into the base of the walls. In addition, the direct impact of the rain and the run-off erodes the mortar. Walls, left exposed on one side and covered with soil on the other, are subject to lateral migration of water.

"The water infiltrates, migrates to, or rises in the wall, then evaporates on the exposed side," explains Neville Agnew, GCI Special Projects Director. "Soluble salts that come out of the soil just eat away at the walls. The stone is corroding badly."



The conditions described are not unique to Chaco Canyon. They occur wherever architectural ruins are left exposed to the weather. Because these problems are so pervasive and so destructive to archaeological resources, the NPS and the GCI recently initiated a collaborative project at Chaco to document and test strategies for protecting standing architectural remains.

The project was predicated on the use of backfilling as a protective strategy. Backfilling involves reburying the site either wholly or partially — with soil. While backfilling cannot stop deterioration, it can slow it down significantly by establishing a more stable environment for a site.

"There's a debate going on about the extent to which archaeological sites ought to be reburied after excavation," observes Dr. Agnew. "Some archaeologists want to leave them for the public to see. This creates a huge problem of maintenance. We espouse the position that sites should be displayed only if they can be properly maintained. If they can't, they should be reburied."

Backfilling actually occurred in a number of places in Chaco Canyon after excavations in the 1890s and 1920s. In order to document the benefits of backfilling in preserving archaeological remains, the NPS, as part of its collaborative project with the GCI, partially reexcavated six rooms — all of which had been thoroughly photographed at the time of their original excavation. During the reexcavations, which occurred in June 1992, the rooms' present conditions were comprehensively documented before the spaces were again backfilled. The results of this effort will be reviewed over the next few months.

The findings will have important implications for the future use of backfilling. "We hope to obtain some reliable data about backfilling,

Facing page: Pueblo Bonito. Photo: Nevada Weir, The Image Bank. This page: Room 62, Pueblo Bonito, excavated by the Hyde Expedition in 1896. Photo: American Museum of Natural History.

and demonstrate its efficacy and flexibility as a protective strategy” says Martha Demas, a GCI Training Program Fellow involved in the project.

Mr. Taylor, who is the NPS’s principal investigator on the project, believes NPS management now realizes that backfilling can be a viable way to preserve certain areas, especially those that are not actively being seen by visitors. It is a technique, he feels, that the public needs to understand as well.

“It’s a matter of making the public aware that what we’re after is preserving the resource — not covering everything up so that they can’t see it,” says Mr. Taylor. “We’re being very selective. We don’t want to backfill areas that the public really needs to see to understand the history of particular areas.”

As Dr. Demas points out, backfilling need not be incompatible with public presentation of a site. “There’s a tendency to think that when you backfill, you have to fill up the whole site,” she says. “But there are degrees of backfilling. It doesn’t have to be total.” At Chaco, for instance, many excavated rooms and

spaces are partly backfilled while others have been left unfilled so that their full extent can be seen by visitors. Unfortunately, the resulting difference in fill levels between adjacent rooms creates problems. Besides placing unequal pressure on walls, it leaves the exposed side of a wall subject to the migration of moisture and salts from the filled side. That is exactly what happens when it rains.

To address these problems, NPS and GCI staff together developed two experimental strategies to deal with the difficulties created by partial backfilling. They also developed two strategies focused on seasonal protection of the walls from snow melt. All four strategies have applicability to other sites with standing archaeological remains.

Testing of the strategies began in November 1991. Dr. Demas says that the methods were purposefully kept simple. “The intention was to design strategies that could be easily implemented — not high-tech. The only thing that’s high-tech about this project is the geosynthetic materials we’re using.”

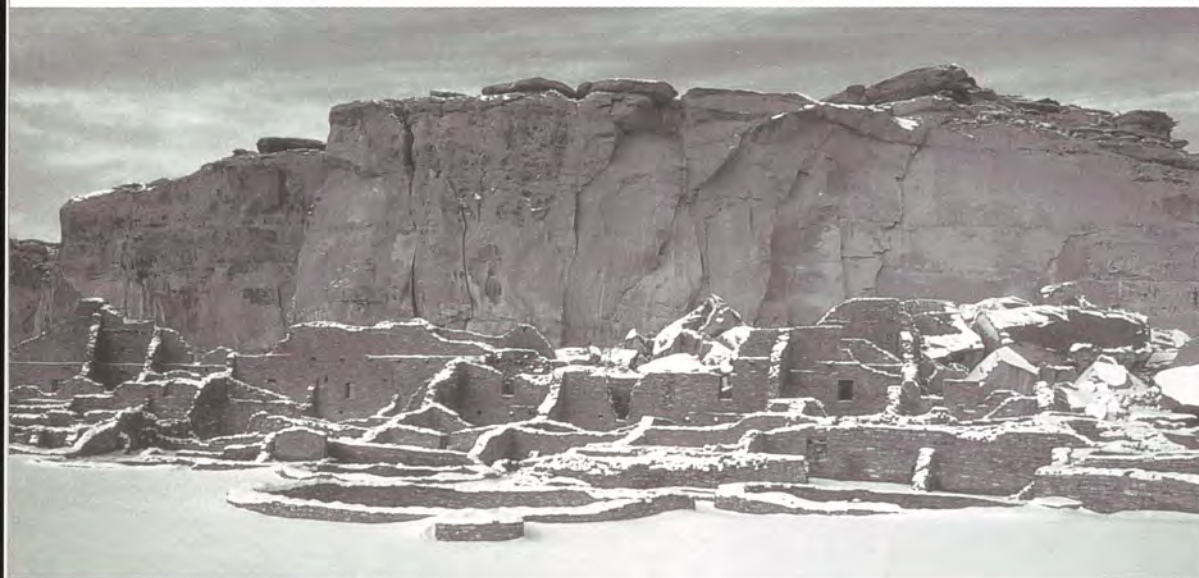
Geosynthetics is a generic term for a class of products (e.g., geotextiles and geodrains) composed of synthetic materials that perform a variety of functions, ranging from separation and filtration of soils to drainage of water. These materials, which are used extensively in civil engineering works such as road and building construction, have only begun being applied to archaeological site protection.

Of the two tests dealing with backfilling, the first involves installation of a vertical geodrain on the backfilled side of a room wall to alleviate pressure on the wall, prevent water migration, and limit the capillary rise of moisture. The second test is a horizontal geodrain placed over the surface of a fill and is intended primarily to drain off surface water from rain and melted snow.

Of the two tests devised for seasonal protection, one deals primarily with snow accumulation through the installation of a geodrain and an impermeable geomembrane along the base of a wall. The other test uses seasonally-installed, impermeable geomembranes to protect the tops of walls from water penetration and eliminate the need for snow removal.

The first three tests are being conducted at Pueblo Bonito. The fourth test (only in place during winter months) is being done nearby at Pueblo del Arroyo, another Great House of Chaco. The tests will be monitored for four years. On the basis of a preliminary inspection conducted this spring, the wall capping appears to be effective in providing protection from the detrimental effects of snow melt.

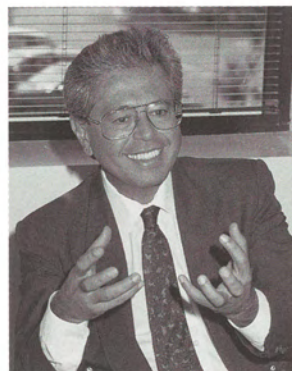
Mr. Taylor hopes that the strategies being tested — combined with the results of temporary reexcavations — will help strengthen the case for backfilling as an effective protective strategy for sites. “So many sites are exposed, and so many of them are being lost not only through natural deterioration, but vandalism. If they’re not dealt with in some manner, many sites just aren’t going to be around in the future.” □



The most erosive factor in the walls’ deterioration is water. In winter, snow piles up on the tops and at the base of the walls. Water percolates down from the top, freezes at night in wall cavities, and leads to buckling of the masonry. Snow melting on the ground creates a rising dampness that causes erosion at the base of the walls.



G C I NEWS



SUSAN ZWEIFLE

R E C E N T E V E N T S

Materials Issues in Art and Archaeology

At the Materials Research Society's annual spring meeting, held this year in San Francisco, the Getty Conservation Institute and the Smithsonian Institution sponsored their third symposium on "Materials Issues in Art and Archaeology." The symposium, which ran from April 27 to May 1, 1992, was organized by James Druzik of the GCI, Pamela Vandiver of the Conservation Analytical Laboratory of the Smithsonian Institution, George Wheeler of the Metropolitan Museum of Art, and Ian Freestone of the British Museum.

Nearly 100 papers and posters were presented during the five-day symposium. Topics covered in the sessions included: treatment, deterioration, and structures in architectural materials; techniques for technical analysis; behavior of materials used by the artist, artisan, and conservator; and technical analysis of art and archaeological materials, metallurgy, glass, and ceramics.

In light of recent armed conflicts around the world, there was also a session on the protection and loss of cultural heritage during warfare. The session was addressed by Miguel Angel Corzo, Director of the GCI (see sidebar).

The proceedings of the symposium will be published by the Materials Research Society in the fall. For further information contact: Materials Research Society, 9800 McKnight Road, Pittsburgh, Pennsylvania 15237-6006.

Speaking to a session of the Materials Research Society's third symposium on "Materials Issues in Art and Archaeology," Miguel Angel Corzo, Director of the GCI, explored ways of strengthening the 1954 UNESCO Convention for the Protection of Cultural Property in the Event of Armed Conflict. In explaining the necessity for action, he told symposium participants:

"It is not our business at this meeting to comment on the means by which the ultimate war — the war against war itself — may be won. But it is valid to ask why we should spend time and resources to safeguard art and culture in periods of armed conflict when precious human lives are at risk. Let me state that my personal and primary concern as a human being is the survival of human life. Our task as conservation professionals, on the other hand, is the protection of the human spirit as it manifests itself in the tangible, artistic products of culture. To the devil's advocate who would mischievously quote Oscar Wilde that art is useless, I would reply that useless it is indeed — if we were to judge the matter from a purely utilitarian perspective. Art is in fact as useless to society as the spirit is to the body. The human species as a biological organism can survive without art and culture but the definition of what it is to be human cannot. Culture is to human civilization as trees are to the environment. That is the justification for our preoccupation with its survival."

UPCOMING EVENTS

Nefertari Exhibition

The Getty Conservation Institute and the J. Paul Getty Museum are presenting an exhibition on the conservation of the wall paintings of the Tomb of Nefertari, which will open to the public on November 12, 1992. The exhibit will document the recently completed conservation of the 3,200-year-old tomb, located in Egypt's Valley of the Queens. The tomb's conservation, which began in 1986, was a joint project of the Egyptian Antiquities Organization (EAO) and the GCI.

This is the first exhibition to chronicle one of the GCI's international conservation campaigns and also the first exhibit on site conservation to be shown at the Getty Museum, known for its outstanding collection of antiquities and European art. It marks as well the first time the Museum and the GCI, both organizations within the J. Paul Getty Trust, have collaborated on a Museum show. The purpose of the exhibition is to increase public awareness of *in situ* conservation and its importance in the preservation of cultural property worldwide.

A full-size photographic replica of a chamber in the tomb will be erected in the Museum. The show will include photographic documentation of the conservation work itself, and 33 objects associated with Queen Nefertari or with images in her tomb. The exhibit catalogue will include essays on the EAO-GCI Nefertari Project and on the historical and cultural significance of the wall paintings. The exhibition will be at the Getty Museum in Malibu, California, from November 12, 1992 until February 21, 1993. In the spring of 1993 it travels to Mexico City for display at the Centro Cultural/Arte Contemporáneo. From there, the exhibition moves to the Fundación "La Caixa" in Barcelona, Spain, in the fall of 1993.



GUILLERMO ALDANA



K. L. GAURI

RECENT PUBLICATIONS

Epoxy Resins in Stone Consolidation

The publication of this seventh volume in the Getty Conservation Institute's Research in Conservation series, *Epoxy Resins in Stone Consolidation*, marks the first such work on architectural conservation. This book presents a review of research on the use of epoxy resins as consolidants for sculpture and buildings. It deals with both the methods and materials used by conservators, focusing on a detailed chemistry of the materials as well as the practical methods of application.

Epoxy resins have been widely used as structural adhesives to repair cracks in commercial and historic buildings, but the application of this technology to the stabilization of fragile stone has generally failed. However, the proper formulation of epoxy systems with solvents has solved problems of viscosity, penetration, crust formation, and discoloration, leading to two different schools of treatment detailed in the publication. Conservators in Europe have concentrated on the treatment of statuary and isolated sections of structures, with alcohol solutions of the resins maintained in contact with the surface for a period of time in order to get deep penetration. In the United States, treatment has focused on stabilizing entire structures or major portions of buildings by spraying them with acetone solutions of epoxy resins.

The various techniques of application are discussed and evaluated. The book seeks to provide an expanded inventory of these different techniques allowing the conservator to make informed judgments.

UPCOMING COURSES

Management of Grotto Sites in China

The Getty Conservation Institute and the State Bureau of Cultural Relics in China will offer the first course ever to be held in China on Grotto Site Management, October 12–23, 1992, at the Yungang Grottoes near Datong. Over twenty managers of cave sites throughout China will attend the course to review guidelines and international standards in conservation that will assist them in developing management procedures and practices appropriate to local conditions. Lecturers will include Sharon Sullivan, Director of the Australian Heritage Commission; Stephen Rickerby, wall paintings conservator; and Margaret Mac Lean, GCI Training Program Senior Coordinator.

The Yungang Grottoes are the site of a special project conducted by the Getty Conservation Institute and the State Bureau of Cultural Relics since 1989 to study site deterioration and its causes, to develop technical solutions to these problems, and to provide professional training to staff in both technical and managerial areas as they relate to the conservation of sites.

RECENT COURSES

Conservation in Field Archaeology

Between March 22 and April 3, 1992, the Israel Antiquities Authority (IAA) and the GCI cosponsored a course on "Conservation of Excavated Materials and Sites" in Israel. The course was designed for professional archaeologists working in Israel. Its objective was to improve skills in the safe retrieval and transport of excavated materials to storage or study facilities. The course also reviewed appropriate techniques for the stabilization of excavated features and sites.

Information covered in the course included: principles of conservation; basic causes and processes of chemical and physical deterioration; specific on-site techniques such as lifting, molding, packing, and handling; selection, procurement, and use of conservation materials under field conditions; and stabilization of excavated sites. Principal instructors included Stephen Koob of the Smithsonian Institution's Freer Gallery; Robert Payton of the Museum of London; Giora Solar, Director of the Preservation Section of the IAA, and Margaret Mac Lean of the GCI Training Program.

Amir Drori, the Director of the IAA, opened the course with an address expressing the enthusiasm of the IAA for the work of conservation in archaeology. He also met with participants at the course's conclusion for an intensive discussion on the policy needs of the IAA regarding site and object conservation.

Preventive Conservation

The GCI's annual course on preventive conservation for museum collections was held May 4–20, 1992, at its Marina del Rey facility.

The goal of the course is not only to provide participants with up-to-date technical knowledge, but also to increase their understanding of the various factors — both technical and organizational — that can influence the implementation of preventive conservation within museums. Participants are taught preventive conservation strategies that take into account and encompass both technical factors and institutional needs.

The course, which has been increased from ten to thirteen days, is designed for mid- to senior-level conservators. This year's course had 20 participants from 10 countries, including: Australia, Canada, Colombia, Hungary, Israel, the Netherlands, Sweden, the United Kingdom, the United States, and Venezuela.

Principal instructors for the course included Gordon Anson of the National Gallery of Art, Washington, D.C.; Dennis Brown of INTEC Facilities Inc., Silver Spring, Maryland; James Druzik of the GCI; Murray Frost of Cultural Building Consulting Inc., White Rock, British Columbia; Mark Gilberg, Nicasio, California; Cecily Grzywacz of the GCI; Gordon Hanlon of the J. Paul Getty Museum in Malibu, California; Wendy Jessup of Wendy Jessup and Associates, Arlington, Virginia; Mervin Richard of National Gallery of Art, Washington, D.C.; Robert Spich of the Western Washington University in Bellingham, Washington; and Sarah Staniforth of the National Trust for Places of Historic Interest or Natural Beauty, London, England.





Nicholas Stanley Price

Deputy Director, The GCI Training Program

A native of England, Dr. Stanley Price came to conservation by a circuitous route. His undergraduate work at Oxford University began with Latin and Greek, but his study of Homer stirred a curiosity about archaeology as an independent source of evidence for ancient history. This curiosity led to graduate studies in prehistoric archaeology and a doctorate in 1976 with a thesis on the early prehistoric settlement of Cyprus.

After some ten years of archaeological administration and fieldwork in Cyprus and the Middle East, Dr. Stanley Price found himself the Assistant Archaeological Advisor in Oman. His responsibilities in Oman for national archaeological collections and site conservation coincided with a growing concern for the deteriorated state of many abandoned excavated sites in the Middle East. Convinced of the need to rectify the lacuna in his own education as an archaeologist, he went to ICCROM in Rome to take a course on "Scientific Principles of Conservation." He then joined the ICCROM staff as coordinator of the same course, while also working to promote the protection of archaeological sites through organizing training courses, conferences, and publications. In 1987, he joined the Training Program of the GCI.

He believes the GCI has had a notable impact internationally by identifying training needs not being met, and then providing opportunities for mid-career professionals to refine their skills or acquire new ones. GCI's courses in rock art conservation, which Dr. Stanley Price has been responsible for developing, are an example of a response to needs in a previously neglected field. Dr. Stanley Price also contributes to international conservation activity through the ICOM Committee for Conservation, which he serves as Treasurer and as Coordinator of its Working Group on Training.

Shin Maekawa

Head, Environmental Sciences, The GCI Scientific Program

Born in Japan, Mr. Maekawa studied applied mechanics at the University of California, San Diego, and then went on to receive a master's degree in mechanical engineering from the University of California, Los Angeles in 1978. His areas of specialty include mathematical and physical modeling of fluid mechanics, heat transfer, and mass transfer systems.

Following graduation, Mr. Maekawa worked as a senior engineer in the research and development division of Honeywell, an aerospace and defense company. There he spent over ten years doing oceanographic and marine engineering work. Although he enjoyed the field research aspect of the work, its defense and weapons orientation was personally unsatisfying. He wanted to apply his abilities to something he felt was more positive in nature.

It was Mr. Maekawa's father-in-law, the president of a cultural foundation in Japan, who first told him of the work of the GCI. Mr. Maekawa, who had always been interested in the arts, especially painting, visited the Institute in 1987. Two years later he joined the GCI's Scientific Program.

Since coming to the GCI he has developed, using existing technologies, autonomous solar-powered environmental monitoring stations to collect data that can aid in a cultural site's conservation. In the last two years he has installed monitoring stations at sites in China, Egypt, Ecuador, Bolivia, and the United States. At present, he spends nearly a third of his time in the field working on these stations. He hopes to refine the technology further so that all field work at the stations can be easily managed by local staff.

Mr. Maekawa is also conducting research on microenvironmental issues in museums — in particular, the problem of moisture migration in display and storage cases. In the future he will be studying the use of passive and semipassive environmental controls in buildings situated in tropical climates, with the objective of identifying those controls that are the most effective and cost-efficient.





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